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Research Letter

Dear Editor,

Association between incontinence, incontinence-associated dermatitis and pressure injuries: A multisite study among hospitalised patients 65 years or older

Incontinence is a well-known issue within the older population. Authors have reported consequences for the affected individual such as incontinence-associated dermatitis¹ which is commonly caused by the prolonged exposure of the skin to urine or faecal material² and therefore mostly located in the sacral or buttock region, where most pressure injuries are also located.³

Both incontinence-associated dermatitis and pressure injuries are highly prevalent in the older population.⁴ One recent study collected empirical data on the associations among incontinence, incontinence-associated dermatitis and pressure injuries in the sacral region.⁵ However, that study did not place a focus on older hospitalised patients. Therefore, the aim of this study was to measure associations among incontinence as well as incontinence-associated dermatitis with respect to (hospital-acquired) pressure injuries in the sacral/buttock region in hospitalised patients (≥65 years).

A secondary data analysis was carried out on data collected as part of an annual, multisite, cross-sectional study, based on the Austrian version of the 'International Prevalence Measurement of Care Problems'⁶ including convenience sampling. Written-informed consent was given by the patients themselves or their legal representatives. The study was approved by the responsible ethical committee.

Data were collected by two trained nurses for each patient. Within this training, for example the German version of the GLOBIAD tool was presented and discussed.⁷ For this study, we included data from all hospitalised patients who were 65 years or older.⁸ In addition, the Care Dependency Scale (CDS), which can range from 15 to 75 (lower scores indicate a higher degree of assessed care dependency) was measured.⁹ We also asked whether the patient was urinary (UI), faecal (FI) or dual (DI) incontinent. A patient that was involuntarily losing urine without experiencing any involuntary loss of faecal material was defined as urinary incontinent. Patients were defined as faecal incontinent when they suffered from any involuntary loss of faecal material but not any involuntary loss of urine. And if a patient lost urine and faecal material, they were identified as experiencing double incontinence. Patients with catheter were included in this study. Focusing on incontinence-associated dermatitis, the survey question for each participating patient was, if an

incontinence-associated dermatitis⁷ was found, based on a skin inspection (yes/no). The questions regarding pressure injuries addressed whether the skin inspection revealed a pressure injury, and whether it had developed before or after the patient's admission to the institution (yes/no). Data were collected on various risk factors, for example 20 points or less obtained using the Braden Scale indicated that the patient was at risk of pressure injuries.¹⁰

Of 17 788 available hospital patients (≥65 years) at the day of data collection, 63.3% (11 317) took part in the

Table 1 Sample characteristics of hospital patients (≥65 years)[†]

	Patients (N = 11 317)
Female % (n)	55.9 (6323)
Mean age in years (SD)	77.1 (7.5)
Operation % (n)	22.2 (2509)
Catheter % (n)	13.0 (1469)
Restraints % (n)	8.2 (925)
Risk for malnutrition by MUST % (n)	18.3 (1447)
Medical diagnosis	
Mean number of medical diagnoses (SD)	1.8 (1.2)
Endocrine, nutritional and metabolic diseases % (n)	15.7 (1780)
Diabetes mellitus % (n)	18.3 (2072)
Dementia % (n)	5.2 (583)
Spinal cord lesions/paraplegia % (n)	0.4 (47)
Cardio vascular diseases % (n)	55.7 (6082)
Stroke % (n)	6.7 (758)
Diseases of the digestive system % (n)	22.2 (2517)
Diseases of the skin and subcutaneous tissue % (n)	7.0 (793)
Diseases of the musculoskeletal system and connective tissue % (n)	29.2 (3307)
Diseases of the genitourinary system % (n)	19.7 (2225)
Mean CDS sum score (SD)	64.2 (15.0)

[†]Values presented are n (%) for categorical data and mean (SD) for metric data. CDS, Care Dependency Scale; MUST, Malnutrition Universal Screening Tool; SD, standard deviation.

Table 2 Descriptive analysis regarding incontinence, incontinence-associated dermatitis and pressure injuries[†]

	Patients (≥65 years)	Number of patients
UI prevalence incl. catheter % (n)	18.2 (2054)	11 269
FI prevalence incl. catheter % (n)	2.3 (255)	
DI prevalence incl. catheter % (n)	7.8 (878)	
INC prevalence incl. catheter % (n)	28.3 (3187)	
IAD prevalence % (n)	1.4 (156)	11 305
Risk patients Braden Scale % (n)	40.5 (4589)	11 317
Number of patients with PI % (n)	4.8 (506)	11 300
Number of patients with hospital-acquired PI % (n)	1.7 (188)	

[†]Values presented are n (%) for categorical data.

Conflict of interest: The authors declare no conflict of interest.

Table 3 Regression analysis for pressure injuries in the sacral or buttock regions

	Bivariate analysis		Linear regression <i>P</i> -value	Multivariable logistic regression	
	<i>P</i> -value	<i>n</i>		<i>P</i> -value	Exp B (95% CI)
Gender	–	506	–	–	–
Mean age in years	–	–	–	–	–
Mean CDS sum score	0.012	–	–	–	–
Operation	–	506	–	–	–
Restraints	–	504	–	–	–
Risk for malnutrition by MUST	–	202	–	–	–
Medical diagnosis					
Mean number of medical diagnoses	–	506	–	–	–
Dementia	–	–	–	–	–
Spinal cord lesions/paraplegia	–	–	–	–	–
Stroke	–	–	–	–	–
Skin and subcutaneous tissue	–	–	–	–	–
Musculoskeletal system and connective tissue	–	–	–	–	–
Endocrine, nutritional and metabolic diseases	–	–	–	–	–
Cardiovascular diseases	–	–	–	–	–
Digestive system	–	–	–	–	–
Genitourinary system	–	–	–	–	–
Diabetes mellitus	0.003	–	0.001	0.001	1.948 (1.295–2.931)
Urinary incontinence only incl. catheter	–	499	–	–	–
Faecal incontinence only incl. catheter	–	–	–	–	–
Double incontinence incl. catheter	–	–	–	–	–
Incontinence incl. catheter	0.010	–	–	–	–
Catheter	0.007	–	–	–	–
Incontinence-associated dermatitis	0.000	505	0.000	0.000	0.200 (0.087–0.456)

CDS, Care Dependency Scale; DI, double incontinence; FI, faecal incontinence; IAD, incontinence-associated dermatitis; INC, incontinence; MUST, Malnutrition Universal Screening Tool; PI, pressure injury; UI, urinary incontinence. Bold values, statistically significant results $P < 0.05$.

Table 4 Regression analysis for hospital-acquired pressure injuries in the sacral or buttock regions

	Bivariate analysis		Linear regression <i>P</i> -value	Multivariable logistic regression	
	<i>P</i> -value	<i>n</i>		<i>P</i> -value	Exp B (95%CI)
Gender	–	506	–	–	–
Mean age in years	–	–	–	–	–
Mean CDS sum score	–	–	–	–	–
Operation	0.000	506	0.000	0.000	0.403 (0.245–0.662)
Restraints	–	504	–	–	–
Risk for malnutrition by MUST	–	202	–	–	–
Medical diagnosis					
Mean number of medical diagnoses	–	506	–	–	–
Dementia	–	–	–	–	–
Spinal cord lesions/paraplegia	–	–	–	–	–
Stroke	–	–	–	–	–
Skin and subcutaneous tissue	0.012	–	0.018	0.021	2.403 (1.143–5.052)
Musculoskeletal system and connective tissue	–	–	–	–	–
Endocrine, nutritional and metabolic diseases	–	–	–	–	–
Cardiovascular diseases	–	–	–	–	–
Digestive system	–	–	–	–	–
Genitourinary system	–	–	–	–	–
Diabetes mellitus	–	–	–	–	–
Urinary incontinence only incl. catheter	–	499	–	–	–
Faecal incontinence only incl. catheter	–	–	–	–	–
Double incontinence incl. catheter	0.002	–	0.034	0.032	1.644 (1.044–2.564)
Incontinence incl. catheter	–	–	–	–	–
Catheter	–	–	–	–	–
Incontinence associated dermatitis	–	505	–	–	–



CDS, Care Dependency Scale; DI, double incontinence; FI, faecal incontinence; IAD, incontinence-associated dermatitis; INC, incontinence; MUST, Malnutrition Universal Screening Tool; PI, pressure injury; UI, urinary incontinence. Bold values, statistically significant results $P < 0.05$.

study. Most of the hospitalised patients (≥ 65 years) were female and 77 years old on average (Table 1). The prevalence of pressure injuries was 4.8%, with 1.7% of all hospital patients (≥ 65 years) developing a hospital-acquired pressure injury (Table 2). Patients with an incontinence-associated dermatitis had a lower risk (OR 0.200; CI 0.087–0.456) of having a pressure injury in the sacral or buttock regions than patients without an incontinence-associated dermatitis (Table 3). Dual incontinent patients, meanwhile, had a higher risk (OR 1.644; CI 1.044–2.564) and patients with a disease of the skin a twofold higher risk (OR 2.403; CI 1.143–5.052) of suffering from a hospital-acquired pressure injuries in the sacral or buttock regions than patients (≥ 65 years) that did not have a dual incontinence or a skin disease (Table 4).

Our results are in contrast to the findings of other studies that reported an increased likelihood of acquiring pressure injuries when suffering from incontinence-associated dermatitis.¹¹ One reason for this difference could be that specific treatments for incontinence-associated dermatitis, such as skin cleansing, re-recommended in the geriatric population,⁴ and therefore, these treatments were carried out more often in this high-risk group. Skin cleansing can lead to more skin inspections in the sacral area including the buttocks, and therefore, the first signs of a pressure injury can be detected much earlier.

One limitation of this analysis was the inclusion of catheterised residents in the data. This might have had masked a possible relationship with pressure injuries. Besides, due to the cross-sectional design of the study, it is not possible to deduct causal relationships between the variables.

Our results showed that incontinence-associated dermatitis was associated with a higher risk for pressure injuries in the sacral or buttock regions. On the other side, dual incontinence was associated with a lower risk for hospital-acquired pressure injury in the sacral or buttock regions. However, as one high-risk groups are geriatric patients (≥ 80 years) and one major setting where pressure injuries occur is within nursing homes, a study focus on this setting specifically in the geriatric population is warranted. Additionally, we recommend that older hospitalised patients (≥ 65 years) with dual incontinence, diabetes mellitus or other known dermatological problems need to receive preventive skin care intervention.

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Research Letter

Dear Editor,

Vitamin D deficiency in patients with acne vulgaris: A systematic review and meta-analysis

Acne vulgaris is a chronic inflammatory disorder of the pilosebaceous unit characterised by increased sebum production and inflammatory cytokines released from the sebaceous glands.¹ Recent studies have found that vitamin D affects these important aspects of acne pathogenesis.^{2,3} Hydroxyvitamin D [25(OH)D] is considered the most appropriate index for the accurate reflection of the vitamin D levels.⁴ Serum levels and deficiency of 25(OH)D have been investigated in acne vulgaris by multiple studies with inconsistent results.^{5,6} We conducted this systematic review and meta-analysis to explore the association between vitamin D and acne vulgaris.

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